
**Parcel C Remedial Action Project Update
(RU-C1, RU-C4 and RU-C5)
SVE Initial Treatment Performance Results
Hunters Point Naval Shipyard
San Francisco, California**

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Contracted Support to NAVFAC BRAC PMO

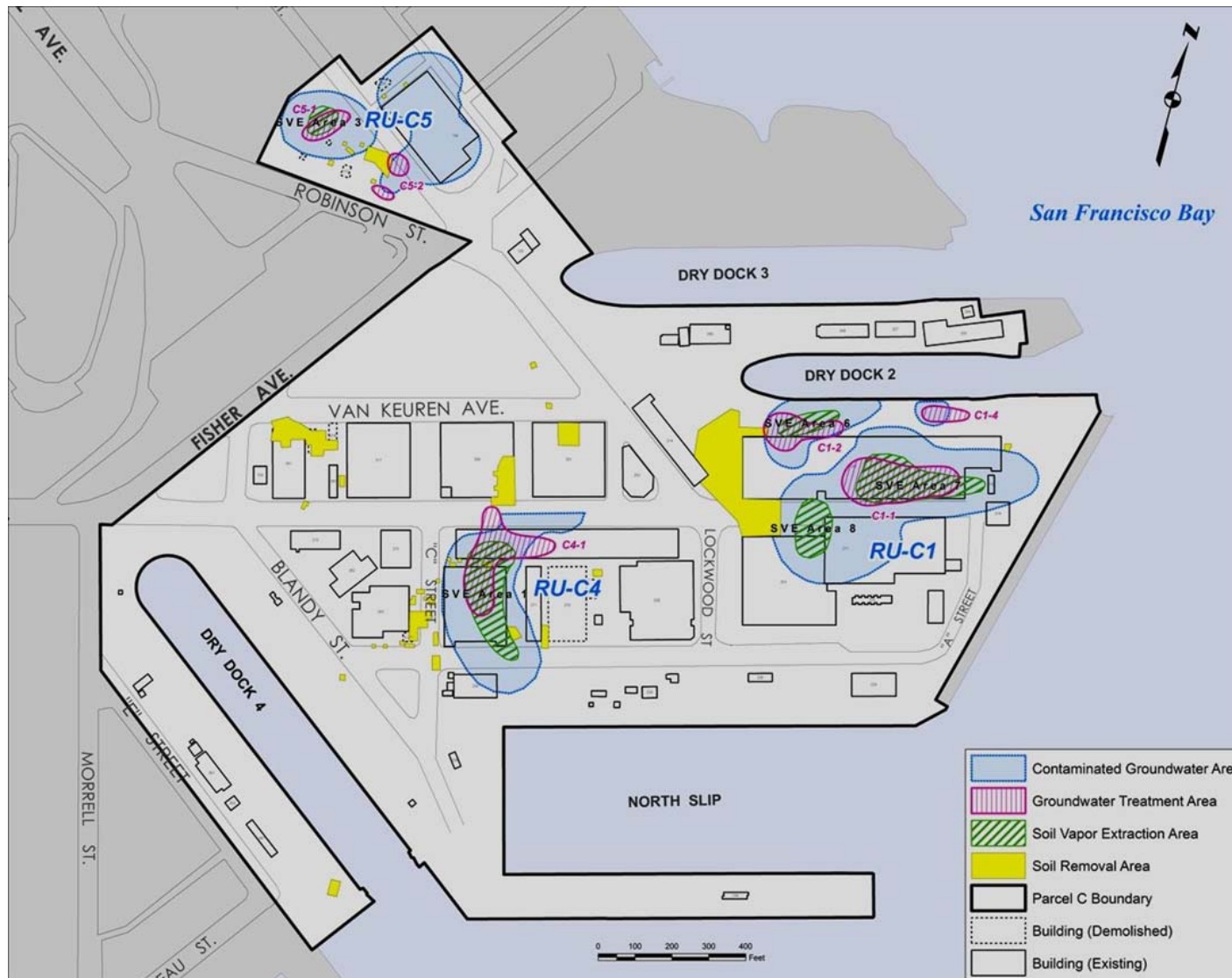
BCT Meeting December 4, 2014

Agenda - Parcel C Remedial Action Update



- **SVE – Initial Treatment Performance Results** (after 2 months)
- **SVE Optimization and Shutdown Evaluation Criteria**
- **Schedule – What's Next?**

SVE Treatment Areas in RU-C1, RU-C4, and RU-C5



SVE Treatment Status Overview



- **SVE treatment in 5 areas of Parcel C – SVE Area 1 (RU-C4); Area 3 (RU-C5); and Areas 6, 7, and 8 (all in RU-C1). RU-C2 SVE system will be on-line in 2015.**
- **SVE system capacities range from 200 CFM (SVE Area 3) up to 1000 CFM (SVE Area 1)**
- **SVE O&M began the week of August 25, 2014**
- **O&M activities include weekly system and wellhead monitoring and monthly influent vapor sampling for laboratory analysis (EPA Method TO-15)**
- **Weekly data collection includes operating vacuums, flows & vapor concentrations (using PID)**
- **1st round of performance sampling from soil gas probes/vapor monitoring points for TO-15 VOC analysis was conducted in October 2014 (2 months into the O&M period)**

RU-C4

SVE Area 1 – System Layout and Vapor Concentration Change



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RU-C4

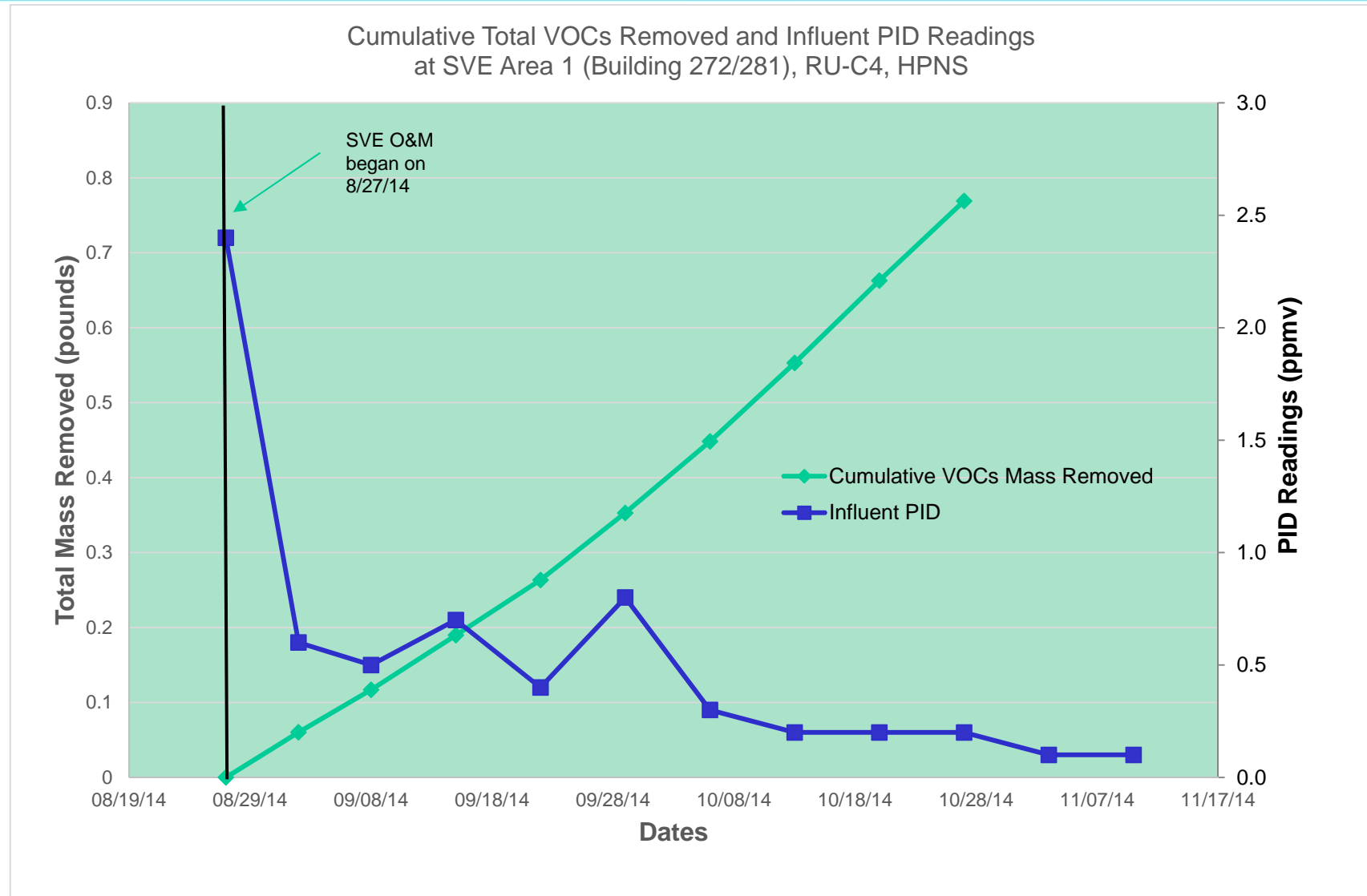
SVE Area 1 – System Performance Summary



- **Extraction airflow @ 700 CFM and operating vacuum @ 2.0" Hg**
- **15 vapor monitoring (VM) wells/soil gas (SG) probes are monitored. Most vapor concentrations are <1.0 ppmv**
- **Vacuum influence of >0.1 inch water column (" wc) observed up to 40 feet from operating SVE wells**
- **Influent total VOC concentrations remain relatively stable, between 190 to 222 $\mu\text{g}/\text{m}^3$, with PID readings between 0.2 and 2.4 ppmv**
- **0.8 lbs. of total VOCs removed after 2 months of operation**
- **TCE concentrations decreased by more than 99% at the three SG monitoring points in Oct. 2014 compared to the baseline samples collected in December 2013**

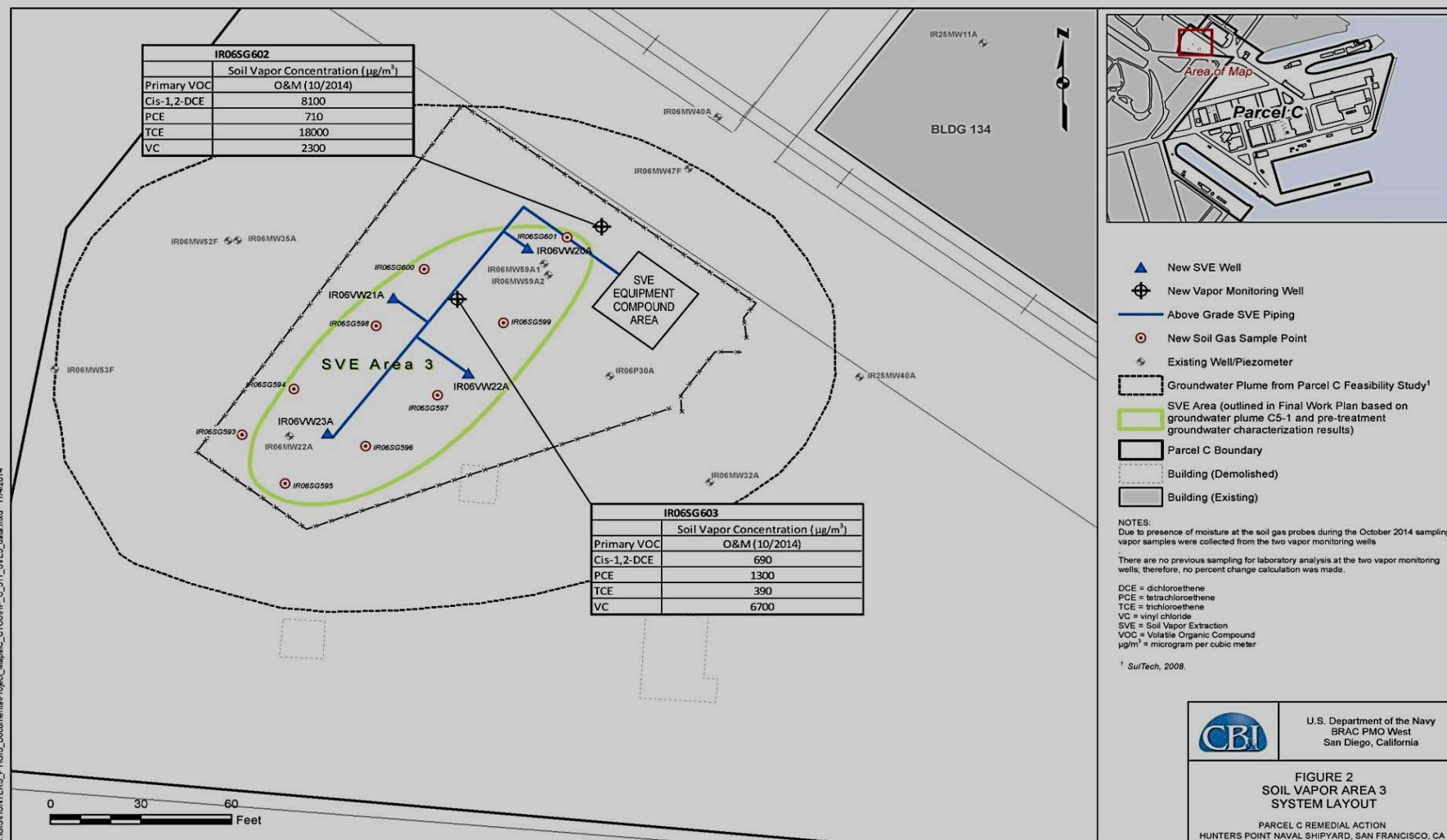
RU-C4

SVE Area 1 – VOC Removal



RU-C5

SVE Area 3 – System Layout and Vapor Concentrations



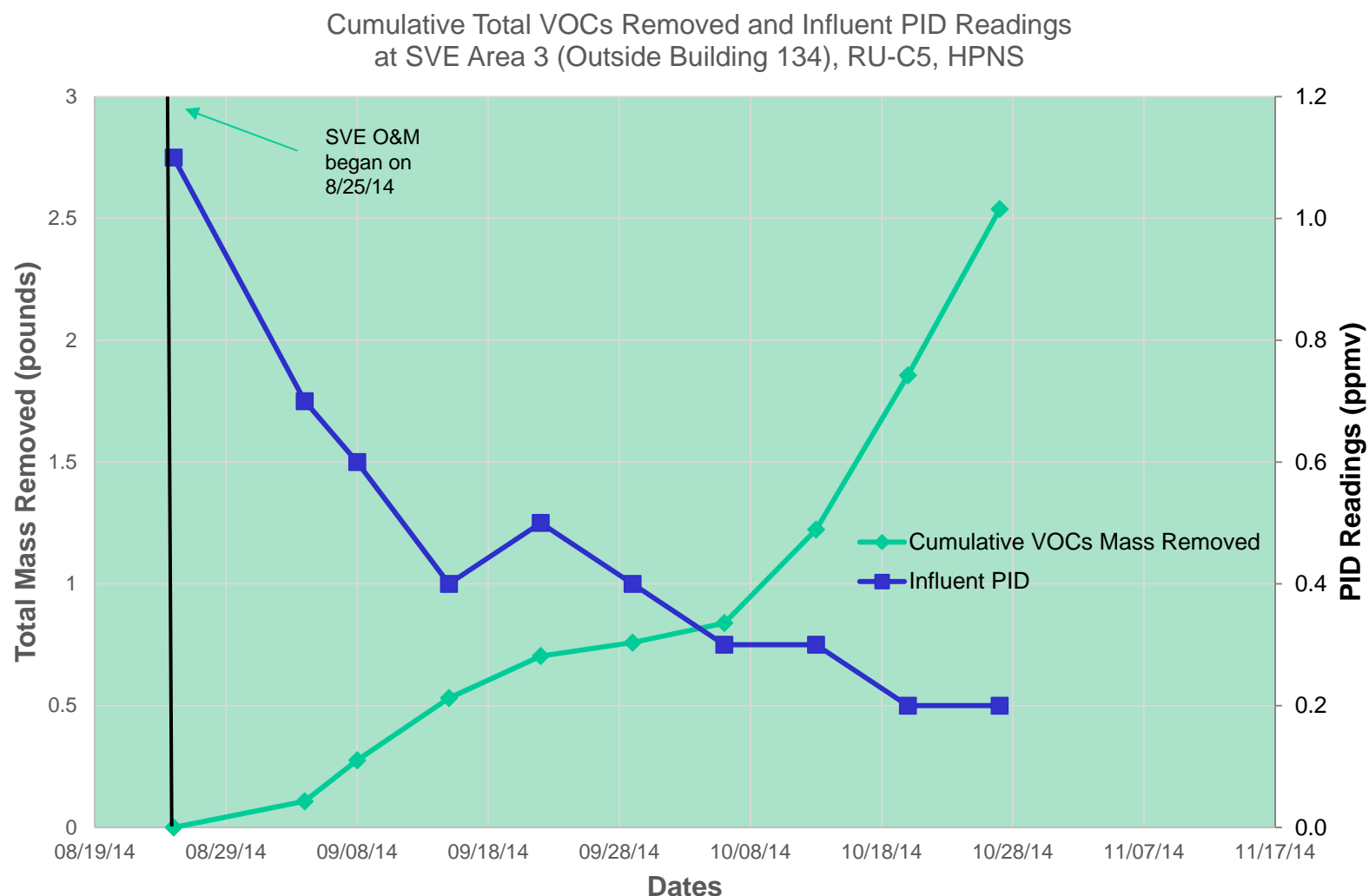
RU-C5

SVE Area 3 – System Performance Summary



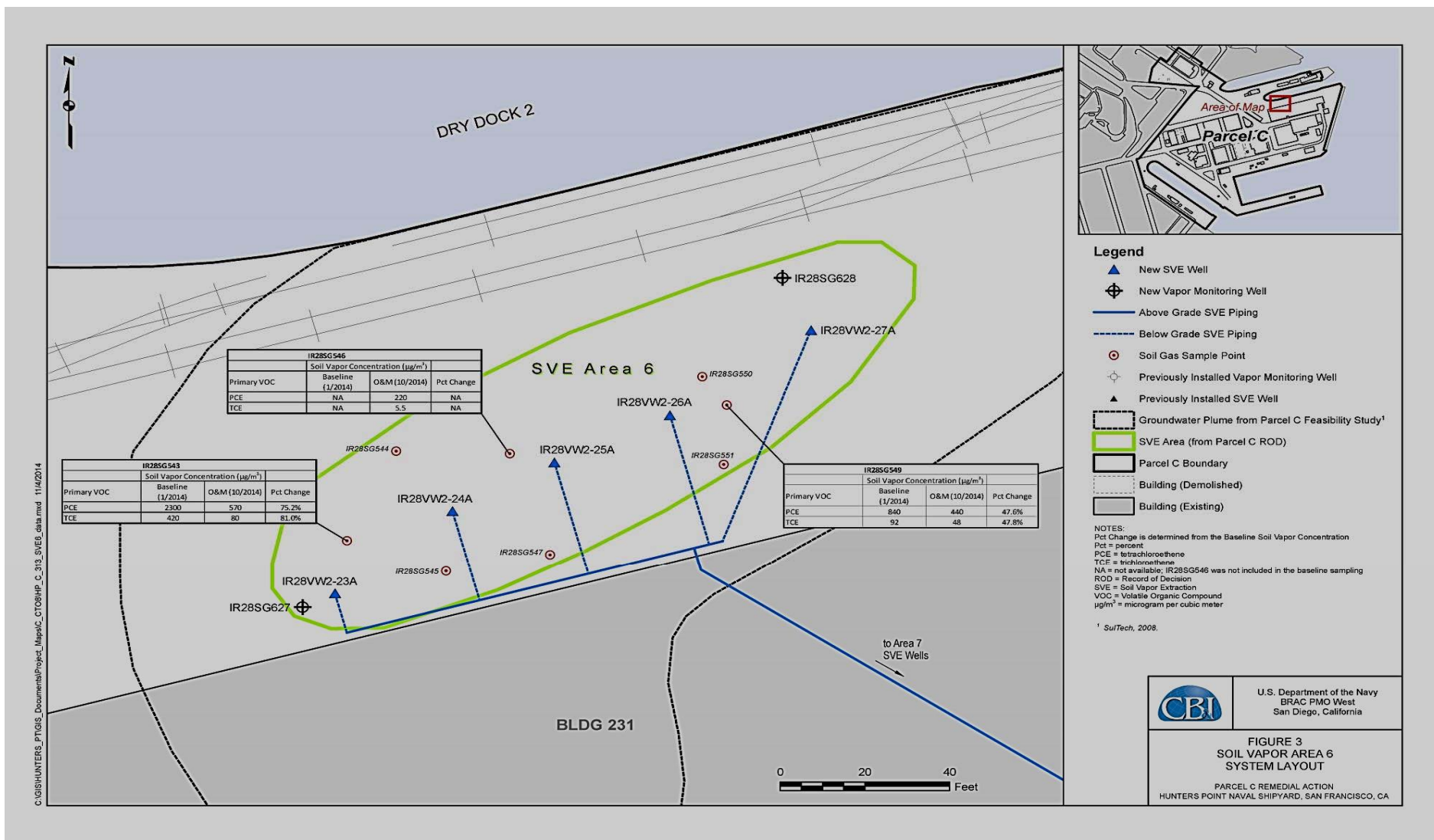
- **System extraction airflow up to 200 CFM and operating vacuum up to 3.0" Hg**
- **Significant water entrainment observed at all 4 SVE wells has caused periodic system shutdowns due to high water level alarm in liquid knock-out tank. Vacuum and flow decreased to reduce groundwater entrainment.**
- **8 VM wells/SG probes are monitored. Most vapor concentrations are <1.0 ppmv**
- **Vacuum influence of >0.1" wc observed up to 25 feet from SVE wells**
- **Influent total VOC concentrations remain relatively stable, between 733 to 1,121 $\mu\text{g}/\text{m}^3$, with PID readings between 0.2 and 1.1 ppmv**
- **2.5 lbs. of total VOCs removed after 2 months of operation**

RU-C5 SVE Area 3 – VOC Removal



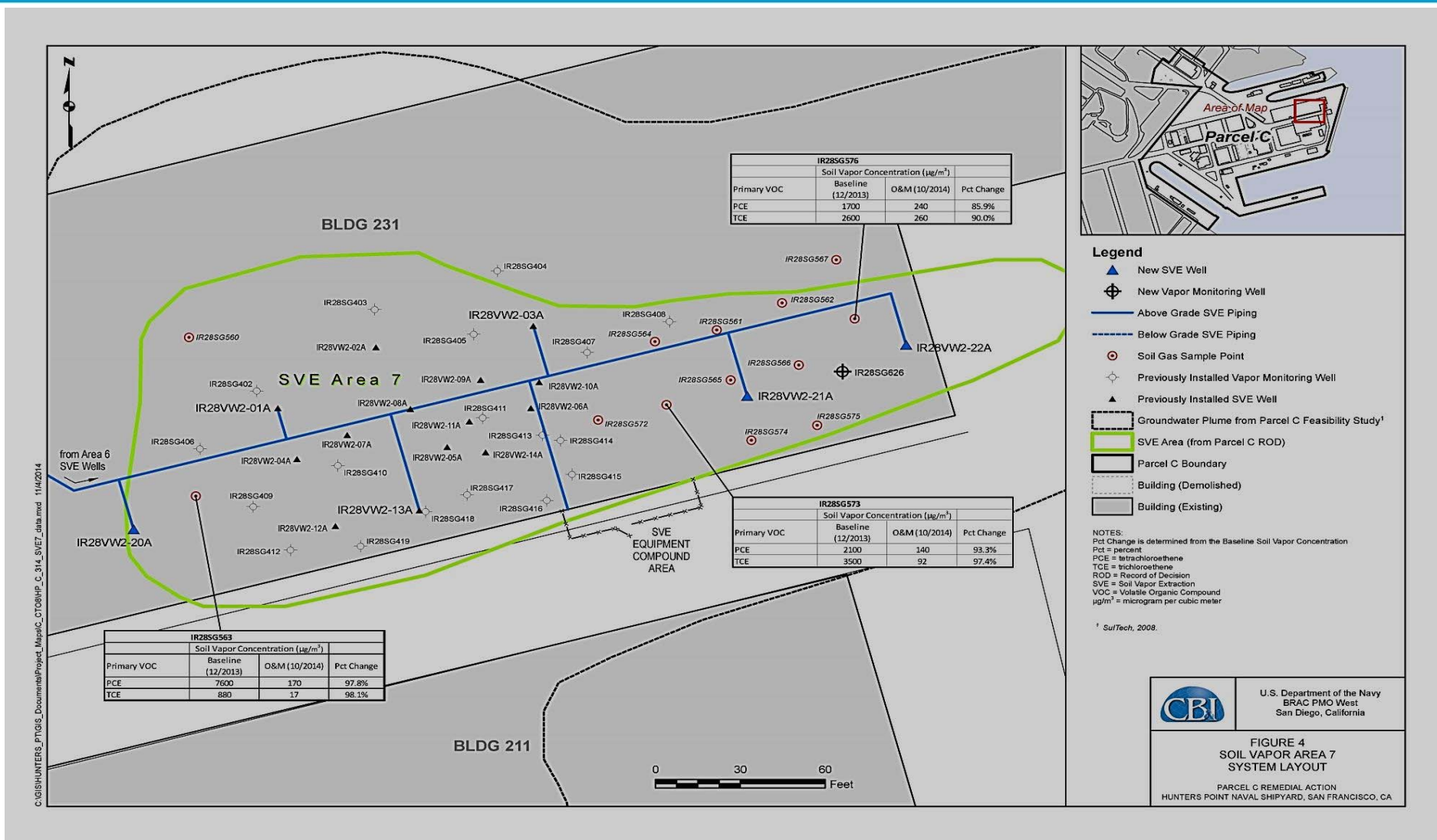
RU-C1

SVE Area 6 – System Layout and Vapor Concentration Change



RU-C1

SVE Area 7 – System Layout and Vapor Concentration Change



RU-C1

SVE Areas 6 and 7 – System Performance Summary



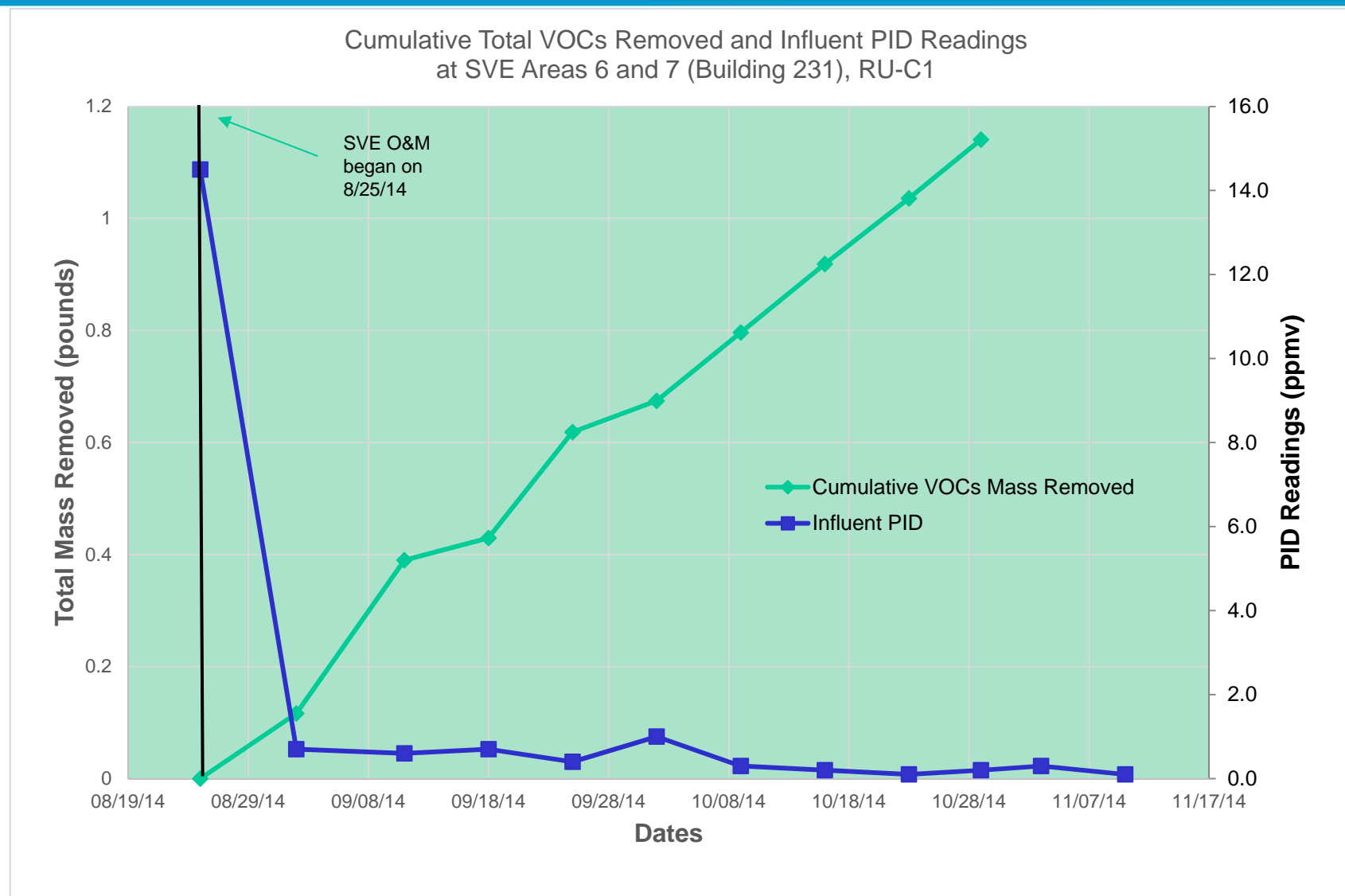
- One SVE system treats Areas 6 & 7 with extraction airflow up to 300 CFM and vacuum up to 3.5" Hg
- Water entrainment observed at SVE wells has caused periodic system shutdowns due to high water level alarm in liquid knock-out tank. Flow and vacuum decreased to reduce groundwater entrainment.
- 7 VM wells/SG probes in Area 6 and 15 VM wells/SG probes in Area 7 are monitored. Most vapor concentrations are <1.0 ppmv
- Vacuum influence of >0.1" wc observed up to 20 feet in Area 6 and up to 60 feet in Area 7 (up to 65 feet was anticipated)
- Influent total VOCs concentrations remain relatively stable, between 651 to 847 μ g/m³, with PID readings between 0.1 and 1.0 ppmv



- **1.1 lbs. of total VOCs removed from both areas after 2 months of operation**
- **In SVE Area 6, based on the October 2014 sampling results, TCE concentrations decreased by 48% to 81% at the SG monitoring points, as compared to the baseline samples collected in January 2014. PCE concentrations also decreased by 48% to 75% in the same time period**
- **In SVE Area 7, based on the October 2014 sample results, TCE concentrations decreased by 90% to 98% at the SG monitoring points, as compared to the baseline samples collected in December 2013. PCE concentrations decreased by 86% to 98% in the same time period**

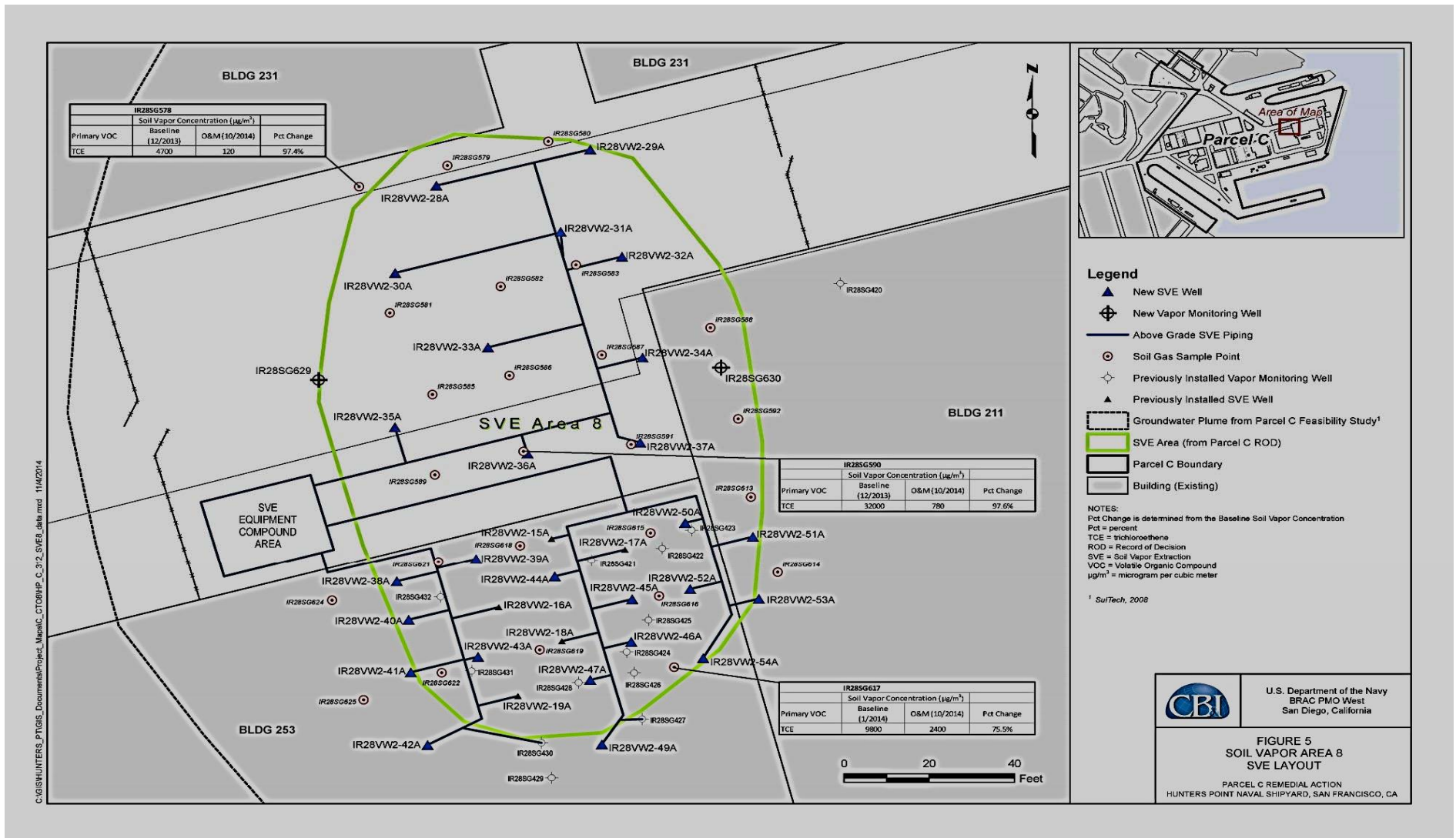
RU-C1

SVE Areas 6 & 7 – VOC Removal



RU-C1

SVE Area 8 – System Layout and Vapor Concentration Change





- **System extraction airflow up to 500 CFM and operating vacuum up to 2.0" Hg**
- **Water entrainment observed at SVE wells has caused periodic system shutdowns due to high water level alarm in liquid knock-out tank**
- **12 VM wells/SG probes are monitored. Most vapor concentrations <1.0 ppmv**
- **Vacuum influence of >0.1" wc observed >20 feet outside and 15 feet beneath buildings**
- **Influent total VOCs concentrations decreased from 3,895 $\mu\text{g}/\text{m}^3$ to 2,095 $\mu\text{g}/\text{m}^3$ with PID readings between 0.2 and 2.3 ppmv**

RU-C1

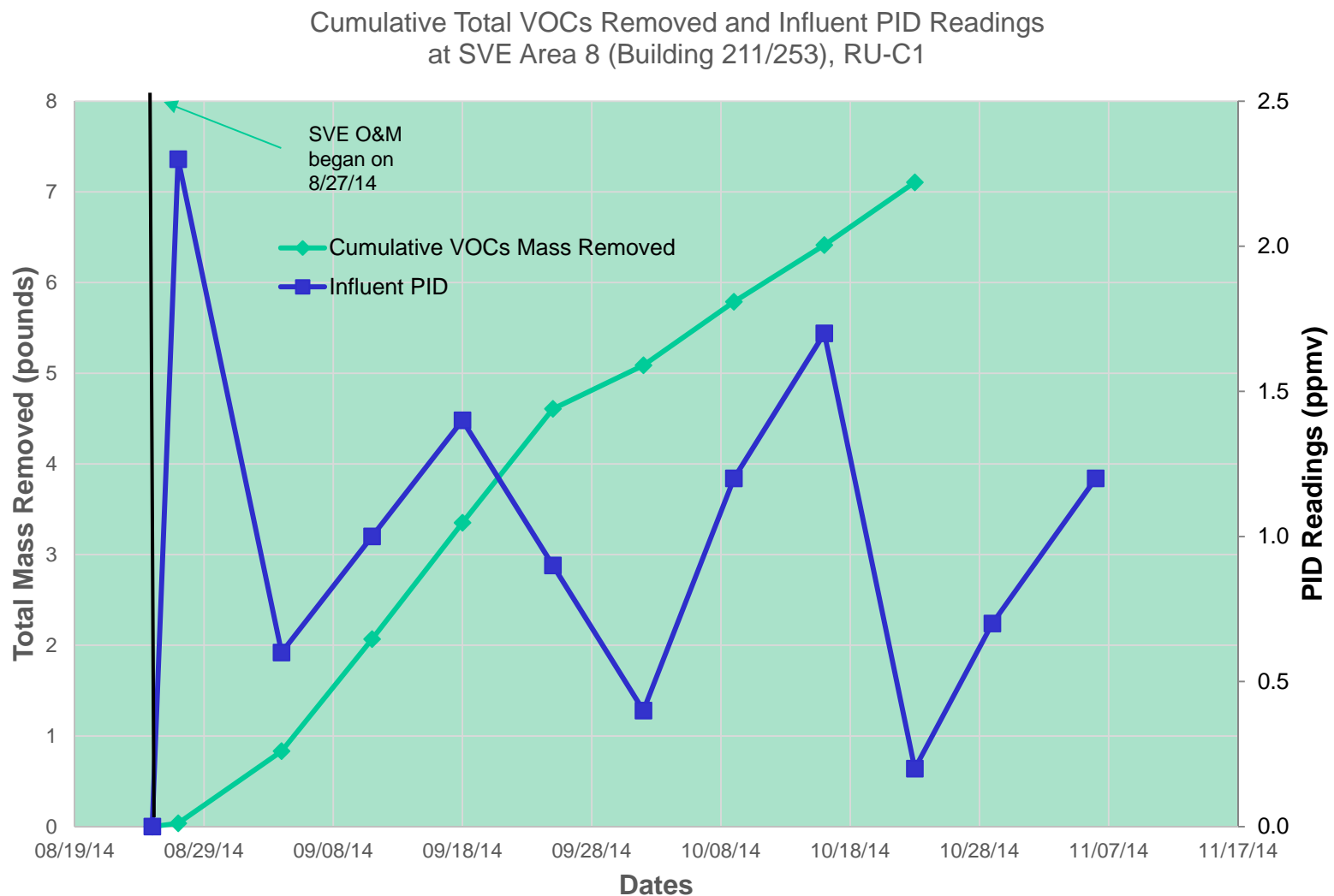
SVE Area 8 – System Performance Summary



- **7.7 lbs. of total VOCs removed after approximately 2 months of operation.**
- **Based on October 2014 performance sampling results, TCE concentrations decreased by 76% to 98% at the SG monitoring points within SVE Area 8, as compared to the baseline samples collected in December 2013 and January 2014.**

RU-C1

SVE Area 8 – VOC Removal



SVE Optimization and Shutdown Evaluation Criteria



- **SVE Optimization Approach:**

- Implement when influent VOC mass removal reaches an asymptotic condition for 3 consecutive months (i.e. VOC mass extraction rates within 10%)

- **3 Options for SVE Optimization to enhance VOC Mass Removal:**

- Cycling: operate portions of the SVE well network at a time
- Pulsing: SVE system may be turned off for a period of time and subsequently turned back on
- Passive air diffusion: open wells in stagnant zones to promote additional air movement and new flow paths to SVE wells

- **SVE System Rebound Sampling:**

- Following optimization, SVE system will be temporarily shutdown for rebound sampling (6 consecutive months)

- **SVE System Shutdown Criteria:**

- VOC levels < soil gas action levels (SGALs; ChaduxTt, 2011) or within 10% over 6 month period; or
- If VOCs > SGALs at 5-year review (i.e., FY17), overall soil vapor concentration trends may be used to assess the need for continued operation or to evaluate alternative treatment per Final Remedial Design Report (KCH, 2012)

- **Operate SVE Systems @ RU-C1, C4 & C5 until asymptotic conditions reached (3-months within 10%)**
 - Conduct 2nd round of SVE performance sampling: Dec. 2014
 - Evaluate performance data: Jan. 2015
- **Implement System Optimization as appropriate**
 - Conduct SVE Optimization per Final SVE System O&M Plan (CB&I, 2014)
- **RU-C2 Planned Path Forward**
 - Conduct SVE using a system from RU-C1, C4 or C5 that has exhibited asymptotic VOC mass removal
 - Change over anticipated to occur Summer 2015
- **Evaluate Site Conditions for Potential SVE System Shutdown**
 - Conduct rebound monitoring for 6 months
 - Evaluate SVE data and present in Parcel C RACR